HAND-BOOK

OF

WOOD ENGRAVING

WITH

PRACTICAL INSTRUCTION IN THE ART
FOR PERSONS WISHING TO LEARN
WITHOUT AN INSTRUCTOR

CONTAINING

A DESCRIPTION OF TOOLS AND APPARATUS USED AND
EXPLAINING THE MANNER OF ENGRAVING
VARIOUS CLASSES OF WORK

ALSO

A History of the Art from its Origin to the Present Time

By WILLIAM A. EMERSON
WOOD ENGRAVER

ILLUSTRATED

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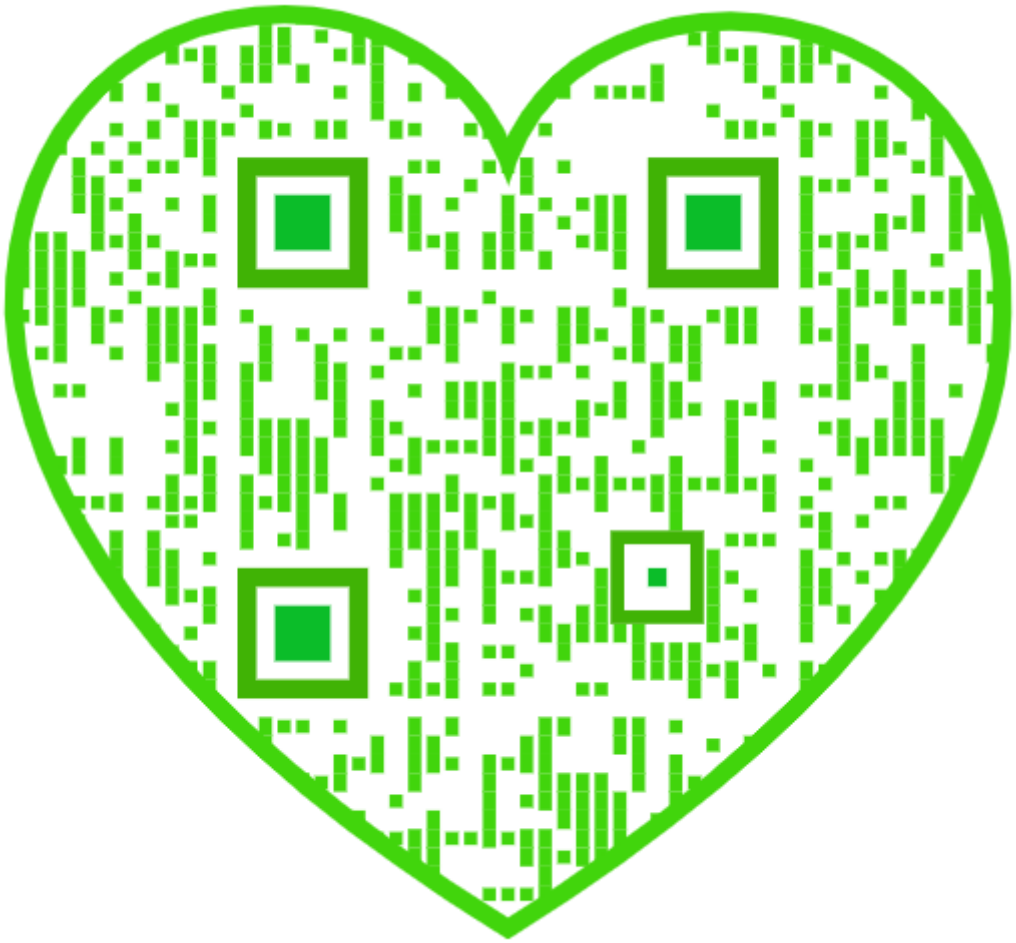

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CONTENTS.

	PAGE
List of Illustrations	3
Introduction	7
Wood Engraving	9
Origin and History	9
The Process Defined	27
Kind of Wood used, and how to prepare it,	28
Tools and Appliances used	31
Drawing on the Block	37
Transfers	42
Engraving	45
Lessons in Engraving	48
Diagrams and Proof-taking	48
Figure Outlines	50
Engraving Tints, and Plugging	53
Portraits	59
Landscapes, Foliage, etc.	62
Flowers, Vegetables, etc.	65
Effective Designs — Silver Ware, Jewelry, etc.	69
Fac-simile Pen Work	73
Monograms and Initial Letters	73
Labels and Cards	76
Buildings	82
Complicated Machinery	84
Birds and Animals	87
Color Engraving	88
Electrotyping	93
Conclusion	94

LIST OF ILLUSTRATIONS.

FIG.	SUBJECT.	PAGE
1.	Egyptian Stamp	10
2.	Monogram of Charlemagne	11
3.	Knave of Bells	12
4.	St. Christopher	13
5.	St. John	15
6.	David and Solomon	15
7.	Isaiah and Ezekiel	16
8.	The Prodigal's Return	16
9.	Armed Knight	17
10.	Tail-piece by Bewick	20
11.	Superstitious Dog, by Bewick	22
12.	Drawing on the Block	28
13.	Block Engraved	28
14.	Boxwood Log in Sections	29
15.	Back View of Bolted Block	29
16.	Section showing Bolts	29
17.	Dowelled Block	30
18.	Amalgamated Block	30
19.	Set of Gravers	31
20.	Set of Tint-tools	32
21.	Set of Scoopers	32
22.	Set of Chisels	32
23.	Graver ready for Use	33

FIG.	SUBJECT.	PAGE
24.	Cut engraved with One Tool	33
25.	Engraving-pad	35
26.	Shade for the Eyes	35
27.	Eye-glass and Stand	35
28.	Angle at which Tools should be Ground	36
29.	Ink-dabber	36
30.	Oil-stone	36
31.	Burnisher	36
32.	Chip Brush	37
33.	Saw for cutting off Plugs	37
34.	Pumice-stone	38
35.	Chinese White	38
36.	Indian Ink	40
37.	Tracing-point	40
38.	Pencil-dividers	40
39.	T Square	41
40.	Parallel Rule	41
41.	Transfer Material	42
42.	Pantograph	44
43.	Engraver at Work	45
44.	Manner of holding Block	46
45.	Manner of holding Block	46
46.	Apparatus used for Night Work	47
47.	Diagrams	49
48.	Diagrams	49
49.	Figure Outlined	50
50.	Figure Finished	50
51.	Outline of Face	51
52.	Outline of Figure	52
53.	Light Tint	54
54.	Dark Tint	54
55.	Graduated Tint	55
56.	Cloud Tint	55
57.	Section of Block, showing Plug	58

FIG.	SUBJECT.	PAGE
58.	Method of lowering Plug	58
59.	Portrait of Man	60
60.	Portrait of Girl	61
61.	Wood Scene	63
62.	Rocks and Water	64
63.	Bouquet of Flowers	66
64.	Basket of Flowers	67
65.	Squash	68
66.	Ear of Corn	68
67.	Design in White	69
68.	Design in Black	69
69.	Effective Design	70
70.	Effective Design	70
71.	Effective Design in Silver	71
72.	Effective Design in Silver	71
73.	Effective Design in Jewelry	72
74.	Pen Work. Design	74
75.	Fine Autograph	74
76.	Coarse Autograph	74
77–85.	Monograms and Initials	75
86.	Label	76
87.	Show-card	77
88.	Cooking Stove	78
89.	Parlor Stove	79
90.	Furniture	80
91.	Organ	80
92.	Building	83
93.	Engine	85
94.	Machine Broken Away	86
95.	Bird	87
96.	Animals	88
97.	The Color Circle	91
98.	Tail-piece	95

INTRODUCTION.

NOT many books have been written on the subject of *Wood Engraving*, and these chiefly relate to the history of the art, being of little practical value to persons wishing to learn to engrave.

The unusual favor with which the first edition of this work was received by amateurs encourages the belief that a more complete and enlarged work might not be unacceptable, and it is with this belief that this book is presented to the public.

In its preparation great pains have been taken both by explanation and illustration to make the subject clear and comprehensive, and to give directions for the practice of the art so that a beginner may be enabled to learn the first principles.

It is not reasonable to suppose that a book of this kind, however full and complete, will take the place of a good teacher, but if for any reason a person desires to make a beginning without a master, he will be enabled to do so by heeding its directions.

Not only is it intended for such as would gain a livelihood by engraving, but also for those who would employ their time in a delightful and profitable manner in the service of art. That this work may be more desirable for those who wish to make themselves familiar with the History of the art as well as its practice, a short epitome of its history is introduced accompanied by *fac simile* illustrations of early wood engravings.

WOOD ENGRAVING.

ORIGIN AND HISTORY.

THE art of wood engraving is of great antiquity, and was practised at an early period, although in a crude state. It is supposed to have originated with the Chinese, who made impressions on paper from wood blocks, as early as 1120 B. C.

Wood stamps, with engraved hieroglyphic characters, were also used by the early Egyptians, for making impressions on bricks and other articles made of clay. This fact was established beyond doubt by the discovery of stamps of this character in the tombs at Thebes, Meroe, and other places.

The following cut represents the face of one of those stamps, which was found in a tomb at Thebes. It has an arched handle at the back, and is of an oblong figure, with the ends rounded

off. It is five inches long and two and a quarter broad.

The figures are cut in, so that their impression on clay would produce raised characters on a flat ground.

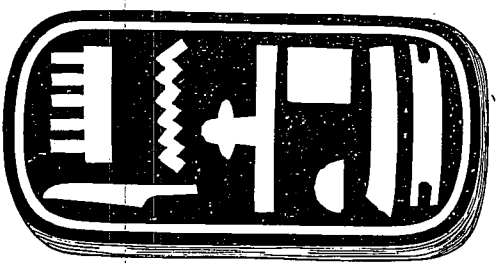


Fig. 1.

Several bricks are on exhibition in the British Museum, which were found on the site of ancient Babylon, bearing impressions of characters or marks made while in a soft state by the use of stamps. Various domestic utensils and ornamental articles made of clay, and of Roman workmanship, have also been found impressed with characters supposed to indicate the potter's name, or that of the owner.

Von Murr, in his *Journal* on the Art of Wood Engraving, in speaking of the Romans, says: "Letters cut on wood they certainly had, and very likely grotesques and figures also, the hint of which their artists might readily obtain from

the colored stuffs which were frequently presented by Indian ambassadors to the emperors."

Impressions, from wood and metal stamps, of monograms, signatures, etc., for signing documents, impressed in a manner similar to that in which letters are postmarked at the present day, are in existence. Among the first of these are the monograms used for this purpose by POPE ADRIAN I. and CHARLEMAGNE.

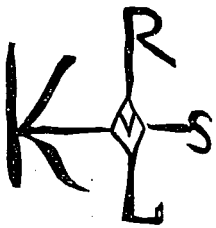


Fig. 2. MONOGRAM OF CHARLEMAGNE.

The principle upon which the art of wood engraving is founded, that of taking impressions on paper with ink from engraved blocks, was known and practised in attesting documents in the thirteenth and fourteenth centuries; and about the beginning of the fifteenth century the principle was adopted by German card-makers for printing outline figures on their cards. Fig. 3 is a *fac simile* specimen.

Fig. 3. KNAVE OF BELLS.

It was next applied to religious subjects. The monks availed themselves of the same principle to represent the figures of saints. One of the earliest of these is in the collection of Earl Spencer, and was discovered in one of the most ancient convents of Germany, pasted within the cover of a Latin manuscript. It represents St. Christopher carrying the infant Saviour across the sea, and is dated 1423. Fig. 4 is a reduced *fac simile* copy

Fig. 4. ST. CHRISTOPHER.

of this curious engraving. An engraved inscription accompanying it is thus translated:

"In whichever day thou seest the likeness of St. Christopher,
In that same day thou wilt, at least from death, no evil blow incur: — 1423."

Thus we see the earliest wood-cuts are awarded to Germany, most of them being on religious subjects, and engraved before the discovery of printing by Gutenberg. They were executed in a rough style, and many of them colored.

The next step was the application of the art to what is known as block-books, consisting principally of devotional subjects, with short engraved inscriptions on the same block. Of these "The Apocalypsis," "The Historia Virginis," and "The Biblia Pauperum," are the most celebrated. An interesting account of these is given in "The History and Practice of Wood Engraving," a valuable standard work by John Jackson.

The illustrations, of which Mr. Jackson gives an elaborate account and several specimens, seem to be drawn with a supreme contempt for perspective and proportion, but bear evidence of the draperies and hands and faces having been carefully studied. Fig. 5 is a copy of one of the cuts in the *Apocalypsis*. It represents St. John preaching to three men and a woman, with the inscription, "*Conversi ab idolis, per predicationem beati Johannis, Drusiana et ceteri.*" (By

the preaching of St. John, Drusiana and others are withdrawn from their idols.)

Fig. 5.

Figs. 6, 7, and 8 are from an edition of the "Poor Preachers Bible," the last work, in a volume printed in three parts, by Pfister about

Fig. 6.

the year 1462, and known as the "Biblia Pauperum."

They are *fac similes* of those given by Camus. In Fig. 6 the heads are intended to represent

Fig. 7.

David and Solomon; in Fig. 7 Isaiah and Ezekiel; in Fig. 8 the subject represented is the Prodigal received by his father.

Fig. 8.

Previous to that time whole books of text were engraved on wood. But the art was to undergo a change. The invention of movable metal type, wedged together in an iron frame, was to super-

Fig. 9. ARMED KNIGHT.

sede the engraved type-blocks; and the impression, instead of being taken by the tedious process of burnishing, was to be more speedily accomplished by the operation of the printing-press.

For a few years after the introduction of typography the art suffered a temporary decline. But it soon revived again. Under the stimulating influence of the press engravings multiplied, until, from being confined to a few towns, they were introduced throughout Europe.

The publication of illustrated books then became general in Germany and Italy, reaching England in 1476.

Fig. 9 is interesting, as it represents one of the first of the English engravings, from a second edition of "The Game and Playe of the Chesse," published the same year by Caxton. The engravings were quite rude, compared with the earlier German works.

About the beginning of the sixteenth century a complete revolution in wood engraving was accomplished by the genius of Albert Dürer. His productions exhibit correct drawing, a knowledge of composition, light and shade, and attention to the rules of perspective, which elevate them to the rank of finished pictures.

It is thought by the best authorities that there is little probability of Dürer having engraved his own designs, for, in most of the wood-cuts supposed to have been engraved by him, we find cross-hatching freely introduced—easily produced by the artist in drawing, but attended with considerable labor to the engraver. Had he engraved

his drawings he would, no doubt, have used means to produce effect which would have been easier of execution. His illustrations were equalled by none of his contemporary artists.

During the first half of the sixteenth century the publication of books illustrated by wood engravings increased, and prevailed to a greater extent than at any other time, with the exception of the present day.

From the beginning of the seventeenth century the decline of wood engraving may be dated; Germany, the cradle of the art, being the first to forsake it. From this time the art suffered great neglect.

In 1765 John Michael Papillon, an enthusiastic professor of the art in France, made an unsuccessful attempt to restore it to its former importance. It was not until 1790 that the genius of Thomas Bewick gave it the impulse which made it what it now is.

Bewick's most important works are his "Histories of British Quadrupeds"(1790) and "British Birds" (1804). Many of the figures were drawn and engraved by himself. The birds especially are executed with a truthfulness and skill which have rarely, if ever, been equalled. These works are also famous for their collections of tail-pieces, which display an infinite amount of humor and pathos. Fig. 10 is a reduced copy

of one of them — a poor ewe, in the starvation of winter, picking at an old broom in front of a ruined cot, a scene which tells a woful tale of suffering.

In none of the cuts by Bewick do we find cross-hatching introduced. He considered it a waste of time, contending that every desired effect could be much easier obtained by plain parallel lines.

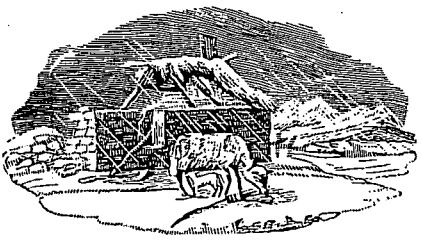


Fig. 10.

"I never could discover," he says in his memoir, "any additional beauty or color that the crossed strokes gave to the impression beyond the effect produced by plain parallel lines. This is very apparent when, to a certainty, the plain surface of the wood will print as black as ink and balls can make it, without any further labor at all; and it may easily be seen that the thinnest strokes, cut upon the surface, will throw *some*

light on the subject or design. And if these strokes, again, are made still wider, or equal in thickness to the black lines, the color these produce will be a gray; and the more the white strokes are thickened the nearer will they, in their varied shadings, approach to white; and, if quite taken away, then a perfect white is obtained. The methods I have pursued appear to me to be the simple and easy perfection of wood engraving for book printing, and, no doubt, will appear better or worse according to the ability of the artist who executes them."

The practical good sense thus expressed finds its confirmation not only in the cuts of Bewick, which are beautiful examples of effect, but also in the best engravings of to-day, in which cross-hatching is discarded for the simpler and more effective methods.

The largest cut engraved by Bewick was eleven and five-eighths inches wide by eight and three-fourths inches high. It is entitled "Waiting for Death," and was left unfinished when he died. The outside dimensions of his other cuts rarely exceeded three by six inches, the vignettes generally falling short of three inches square. One peculiarity which distinguishes the work of Bewick and his pupil from that of the draughtsmen and engravers of the present day, may be expressed in the statement that modern draughtsmen regard the

block upon which they draw as a white surface; Bewick regarded it as black; depending largely for his effect upon the strength and meaning of the white lines. (See Fig. 11.)

Although not an imaginative artist he was quick to detect the humorous side of whatever came under his observation, and what he *saw* he

Fig. 11.

could reproduce with rare fidelity. In his humorous pieces he displays a fondness for placing his figures in awkward or unpleasant situations; as when he represents a horseman entangled in a kite string, which the boy who holds must let go or be dragged into the stream; or when he represents an old man carrying his young wife across a stream, the complaisant look of the sharp-nosed wife, arrayed in a short petticoat, slipshod, and with her heels staring through her stockings, evidently en-

joying the situation, while her husband patiently bears his double burden, and with his right hand keeps a firm grip on his better-half to prevent her from slipping off and into the water; a keen satire on those old men who marry young wives, submitting to every indignity to please their youthful spouses, and reconcile them to their state.

It is difficult to estimate the number of cuts engraved by Bewick; but they may be counted by thousands. "The British Birds" alone contain more than five hundred, and "The Quadrupeds" more than three hundred.

The cuts for the latter were engraved at the rate of more than one per week, and chiefly by night after the day's work in the shop was over. He was led to undertake this work from the dissatisfaction he had felt as a child with the wretchedly executed illustrations in a sixpenny History of Birds and Beasts, and a publication known as the "History of Three Hundred Animals."

In spite of the confinement incident to his calling, Bewick lived to the age of seventy-five, occupied up to the very last upon a work intended to be a "History of British Fishes."

Jackson in his valuable treatise, after alluding to several illustrations in the "British Birds" "as the very best of Bewick's cuts," says: "The tail-pieces in the first edition of the 'Birds,' are, taken all together, the best that are to be found

in all of Bewick's works, but although it is not unlikely he suggested the subjects, there is reason to believe that many of them were drawn by Robert Johnson, and there cannot be a doubt that the greater number of these contained in the second volume were engraved by Luke Clennell;" both were Bewick's apprentices, and it is more than probable that in the drawing and engraving he received considerable assistance from these pupils, who afterwards became distinguished.

Johnson was a draughtsman of great promise, but lived only a short time after the expiration of his apprenticeship.

Clennell's cuts are noted for the freedom with which they are executed, although many of them are rather coarsely engraved. His largest cut was engraved for the diploma of the Highland Society. It was ten and a half by thirteen and a half inches in size. The block upon which he first began to engrave this cut consisted of a surface of boxwood, veneered upon beech. After having spent two months' time on the engraving, the block suddenly split in such a manner as to be worthless. After a few days, however, he had a solid block of boxwood prepared, the design redrawn, and pushed the work on to completion.

For this engraving he received a hundred and fifty guineas and a gold medal from the Society

for the Encouragement of Arts and Manufactures.

Clennell's fellow-pupils were Henry Hale and Edward Willis. Among the prominent engravers of that time, who were also under Bewick's instruction, may be mentioned William Harvey, who was a great favorite of Bewick; John Bewick, a younger brother of Thomas; Charlton Nesbit; W. W. Temple, and others of less note.

John Bewick as a designer and engraver was much inferior to his brother; although many of his cuts possess considerable merit, the greater part of them are executed in a harsh, stiff manner, and are easily distinguished from his brother's, on account of the intense contrasts of positive black with pure white.

Contemporary with Bewick was Robert Branston, William Hughes, and Hugh Hughes, all remarkably proficient in the art, yet it is conceded that his masterpieces have not been surpassed by them nor by any English engravers of a later date, not excepting Thompson, Jackson, Williams, Landells, White, Linton, Martin, Whymper, Powis, and others of equal rank. The service rendered his country and the whole world in reviving the art of engraving after two centuries of decadence entitle him to the distinction of being the father of modern pictorial illustrations in books and periodicals, and such is the esteem

in which he is held, that collections of his books, blocks, autographs, etc., bring large sums of money; the collection of the late Thomas Hugo realizing over five thousand dollars.

Since the time of Bewick the art has flourished without interruption, and at the present time it seems to be at the zenith of success, for never before has there been such a demand for elaborate and costly wood engravings; they are to be found everywhere — in publications of the most expensive kind, in magazines, papers, and books. The comparative cheapness and superiority of this class of engravings for books has led largely to their use, to the exclusion of steel and copper plates.

THE PROCESS DEFINED.

BEFORE explaining the process of wood engraving, let us first consider what this term implies, and in what respect it differs from other kinds of engraving.

Engraving on wood is the process of cutting away all the parts that have not been drawn upon. (See Figs. 12 and 13). It does not include ornamental carving on wood, but only such as is used in printing. The lines which in wood engraving are left standing, in copper plate and steel are cut in the plate, the process being exactly the reverse; and, as a natural consequence, the printing is done in a different manner. The plate being warmed, and the ink rubbed into the engraved lines or grooves, the surface wiped and polished, the card or paper is then laid on, and pressed into the inked lines by

means of a copper plate press. In printing a wood cut, the surface is inked, the same as ordinary type, by the use of a roller, and printed on a common type press, usually with reading matter set up in the same form, the wood being type-high.

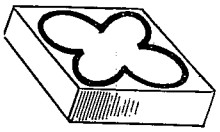


Fig. 12. THE DRAWING.

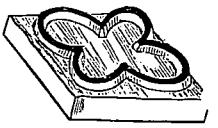


Fig. 13. THE ENGRAVING.

KIND OF WOOD USED, AND HOW TO PREPARE IT.

Several kinds of wood are used, boxwood for all fine work, American rock-maple, mahogany and pine for coarse.

Most of the boxwood used is imported from Turkey for this purpose. It has the closest grain of any wood now known, is light-colored, and will hold a fine, clear line.

The engraving is made on the end of the grain. To prepare the wood for use, it is sawed from the log, in pieces an inch in thickness, as indicated in Fig. 14. The pieces are then made exactly type-

high, by the use of planes and scrapers, producing a smooth, level surface.

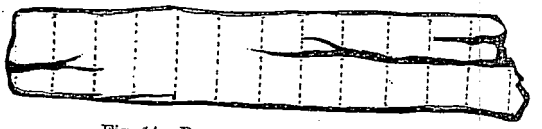
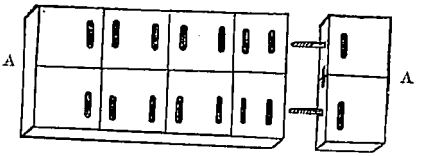


Fig. 14. Boxwood Log in Sections.

In most of our large cities there are dealers who prepare and furnish wood of any size.

Large blocks which require much piecing are usually bolted and jointed together. These can be made of any required size, with the additional advantage that different parts of the drawing may be simultaneously engraved by different engravers, and afterwards bolted together. In this way illustrated papers are enabled to produce, in a day's time, a picture on which a single engraver might work for weeks.



Figs. 15 and 16. Back View of Bolted Block.

Fig. 15 shows the back view of a bolted block, screwed up by means of bolts and nuts. The

front surface is, of course, smooth and even, and prepared to receive the drawing.

Fig. 16 shows the mode of separating the parts which are connected by bolts. At the lines A A the parts are permanently joined with glue, being either dowelled or amalgamated, as shown in Figs. 17 and 18, and are not intended to be separated.

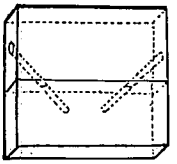


Fig. 17. DOWELLED.

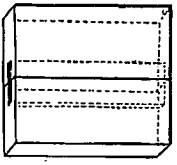


Fig. 18. AMALGAMATED.

Care should be taken, in selecting wood, to have it free from red streaks and black or white spots. The first two mentioned are no indication of poor wood, and seldom trouble the engraver, but they are unpleasant to the draughtsman, by reason of the color. The white spots indicate rotten wood, which crumbles away, and cannot be engraved upon. In selecting wood, choose a pale yellow or straw color, free from blemishes.

TOOLS AND APPLIANCES USED.

A complete set of tools comprises six gravers, twelve tint-tools, three scoopers and two chisels.

The gravers, or lozenge-shaped tools, are evenly graduated from fine to coarse, as represented in Fig. 19. These, being nearly square in shape, enable the engraver to vary the width of the lines from a very fine one to one quite coarse.

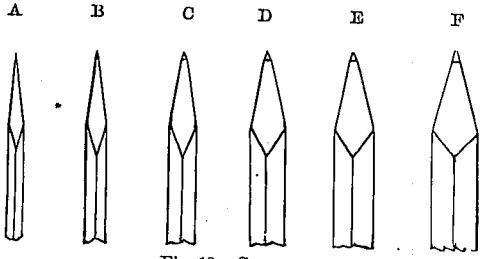


Fig. 19. GRAVERS.

The tint-tools are used in cutting tints, such as skies and flat surfaces (Fig. 20), the finest tool, from which the rest are graduated, being so thin that the line it makes is scarcely visible in printing.

Scoopers, or digging-away tools, are three in number, and are rounded on the bottom (see

Fig. 21), No. 11 being a size larger than the largest tint-tool used. They are employed in clearing away all the wood not drawn upon.

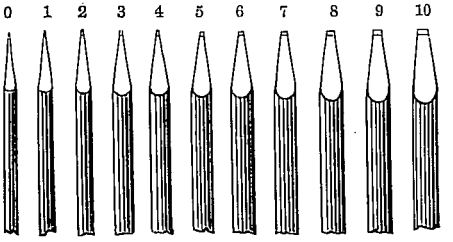


Fig. 20. TINT-TOOLS.

Notwithstanding the work to be done with these tools is coarse and rough, yet a good degree of skill is required to use them properly, as the dead

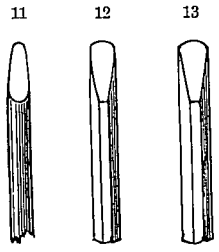


Fig. 21. SCOOPERS.

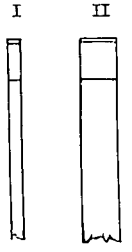


Fig. 22. CHISELS.

wood must be removed from the lines without bruising them, thus securing clear, sharp lines in printing.

The two chisels (Fig. 22) are used in cutting away and leveling the surface when necessary.

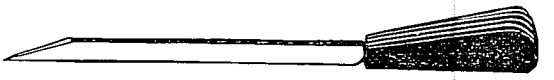


Fig. 23. GRAVER READY FOR USE.

Handles may be made of cork or wood, and should be marked, for convenience, A, B, C, D,

Fig. 24. ENGRAVING EXECUTED WITH ONE TOOL.

E, F; the tint-tools and scoopers, 1, 2, 3, etc., and the chisels, I, II.

For beginners only a small number of tools are necessary, as additions can be made as fast as needed. The following selection is sufficient to commence with: Three gravers, A, D, and F; five tint-tools, 1, 2, 4, 6, and 8; two scoopers and one chisel.

A great variety of work may be done with a small number of tools. As an illustration, Fig. 24 was engraved entirely with one medium-sized graver.

In addition to the tools, the following articles are necessary:

1. Engraving-pad.
2. Shade for the eyes.
3. Engraving-glass and standard.
4. Oil stone.
5. Ink dabber.
6. Box of wood-cut ink.
7. Burnisher.
8. Small saw.
9. Chip brush.
10. India paper for taking proofs.

The engraving-pad should be of good, smooth leather, and filled with fine sand. If well filled, the block can be turned easily upon it, and the longer it is used, the more readily it will adapt itself to the block.

A green shade should be worn, to protect the

eyes from too strong a glare of light from overhead.

Fig. 25. ENGRAVING-PAD.

Fig. 26. SHADE FOR THE EYES.

Most engravers use a magnifying-glass of moderate power; more for relieving the eyes from the strain of keeping them fixed on a small object than for magnifying the work. It should be from an inch and a quarter to two inches in diameter.

A standard, for holding the glass, is made as shown in Fig. 27, the base being of iron or lead, so that it may not be easily overturned.

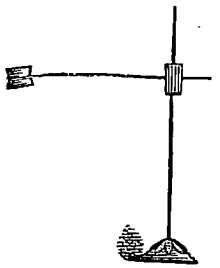


Fig. 27. EYE-GLASS AND STAND.

An Arkansas oil-stone is sufficient for keeping the tools sharp after being ground on a common

grindstone. To sharpen them properly, a few drops of oil should be put on the oil-stone, and the tool rubbed back and forth, great care being taken to hold it steadily, thus securing an even cutting edge.

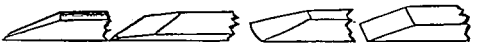


Fig. 28. ANGLE AT WHICH TOOLS SHOULD BE GROUND.

The ink-dabber is a pad, made of fine calf-skin, properly filled, and the leather so firmly drawn

Fig. 29. INK-DABBER.

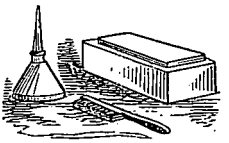


Fig. 30. OIL-STONE.

that no wrinkles will form on its surface while being used.

Fig. 31. BURNISHER.

For an ink-slab take a smooth stone-slab, or plate of thick glass, or a piece of engraver's wood, or anything having a smooth surface, upon which to distribute the ink.

For proof-taking, the best wood-cut ink should

be used, keeping it in a small box having a close-fitting cover to protect it from the dust. India paper, and a burnisher for taking the impressions

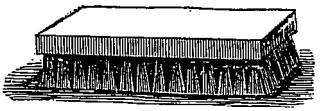


Fig. 32. CHIP-BRUSH.

of engravings, a soft brush for clearing away small chips, and a fine saw for cutting off plugs, complete the list of necessary articles for engraving.

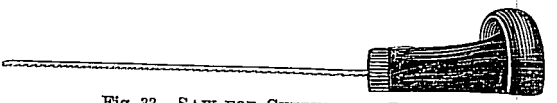


Fig. 33. SAW FOR CUTTING OFF PLUGS.

DRAWING ON THE BLOCK.

In making a drawing on the block, the following articles are used:

1. Piece of pumice stone.
2. Cake of beeswax.
3. Cake of Chinese or flake white.
4. Small camel's-hair brush.
5. Transparent tracing-paper.
6. Case of pencils.

7. Tracing-point.
8. T square.
9. Ruler.
10. Pencil-dividers.
11. Cake of Indian ink.
12. Parallel rule.

Although drawing on the wood and wood engraving are not commonly done by the same person, yet it is very important for the beginner

Fig. 34. PUMICE-STONE.

Fig. 35. CHINESE WHITE.

to be able to make his own drawings. It is true he may secure a better result by employing a draughtsman, but he should make it a part of the instruction in engraving; for, with a knowledge of drawing, acquired by its practice in connection with engraving, he will better understand the drawings of others, and will more readily give the spirit of the artist's meaning.

Wood, as prepared for the engraver, has a polished surface, too smooth for drawing upon with a pencil. To give it the required surface,

moisten the face of the block, and rub it with the flat surface of a piece of pumice stone, being sure first that the stone is even and free from grit. When the gloss has thus been removed, and the little scratches on the surface taken out, brush off with the hand whatever adheres to it, and, with a camel's-hair brush, moisten the surface with Chinese or flake-white mixed with water, and rub in briskly with the fingers, trying to secure an even coating. When it is dry it forms an excellent tooth for the pencil. Care should be taken to use as little water upon the block as possible, as it may cause it to warp.

In order to produce the drawing on the block, a sketch or design is first made on paper, unless you have a photograph or a picture of the exact size you wish. Place thin tracing-paper over the copy, fastening it securely at the corners to keep it in place, and with a soft pencil kept sharp at the point, trace a clear outline. Fasten the tracing-paper to the block, face downwards, by means of beeswax rubbed on the sides. With a tracing-point retrace the lines so that they will be visible on the block. Remove the paper, and with a H H H H H H pencil strengthen the outline, correcting and improving the picture as you proceed. The drawing may then be shaded in with a soft pencil or Indian ink, according to the taste and skill of the learner.

To prepare the Indian ink for use, take a saucer containing a small quantity of water, hold the cake in a horizontal position in the saucer,

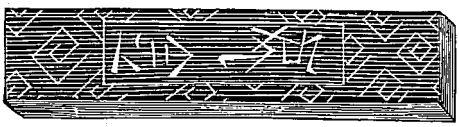


Fig. 36. CAKE OF INDIAN INK.

rubbing it briskly until the water assumes the desired color. In the drawing, accuracy of out-

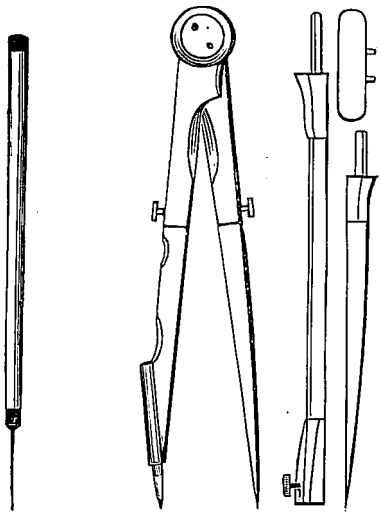


Fig. 37. TRACING-POINT. Fig. 38. PENCIL-DIVIDERS.

line must be observed, for every defect in the outline is more apparent in the engraving when printed.

In drawings where curved lines or circles are introduced, a pair of pencil-dividers is necessary for drawing even lines. They will be found useful not only in describing circles, but for taking measurements, and for a variety of other uses.

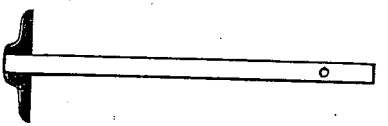


Fig. 39. T SQUARE.

A small T square and a parallel rule are also needed, for drawing parallel or vertical lines accurately.

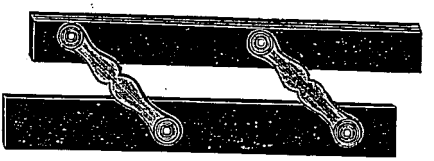


Fig. 40. PARALLEL RULE.

It is usual to cover the drawing with tissue paper while the engraving is in progress, to prevent it from being soiled or the sharpness of the lines destroyed. To do this, cut a piece of paper a little larger than the block, rub the

edges of the block with beeswax, cover it with the paper, drawing it tightly over and burnishing it on the waxed edges. The covering is then cut open at the point where the engraver is to commence, and the opening enlarged as fast as required.

TRANSFERS.

Fig. 41.

In making an exact copy of a wood-cut, steel or lithographic print, the labor of drawing is saved by transferring it to the block in the following manner: The block is prepared by the use of the pumice stone and water without being

whitened. Place the print from which the transfer is to be made in an earthen plate, and pour over it a preparation, made by dissolving caustic potash in alcohol; allow it to remain about a minute, until the ink is softened; rinse the liquid off by dipping it in clear water; absorb the water by touching the lower edge of the print to a piece of blotting-paper; lay the print on the block, and subject it to the pressure of a printing-press, which will, if properly done, reproduce the picture.

Photography has of late years been extensively employed in producing pictures on the block, where drawings or transfers are impracticable, or where a photograph answers the purpose equally well at a much less expense.

A photograph on the wood is engraved in the same manner as a drawing on wood. In many of the illustrated magazines of the present day the original designs are first drawn upon paper, quite large, and afterwards photographed on the block reduced to the required size. In the same way machinery, furniture, buildings, landscapes, etc., may be faithfully reproduced on the block, and a more accurate result secured than if engraved from a drawing, although in working from a photograph greater skill and judgment is required to produce an effective cut.

To put a photograph on wood the assistance of

a photographer is necessary, as it requires a negative suitable for the purpose, and a knowledge of the process which can only be gained by experience.

In most of our large cities there are artists who make a specialty of this kind of work for wood engravers.

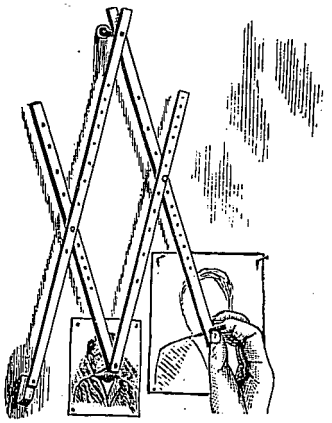


Fig. 42. THE PANTOGRAPH.

Where it is necessary to enlarge or reduce a picture before drawing upon the block, and the services of a photographer cannot be easily secured, it may be accomplished by the use of the Pantograph, a simple and inexpensive instrument, of great practical value to the designer or draughtsman.

ENGRAVING.

The drawing, photograph or transfer being prepared on the block, the next thing to be observed is the mode of sitting at the table and holding the work. The block should rest upon the pad at such an elevation as to allow the learner to sit erect while at work. Hold the block,

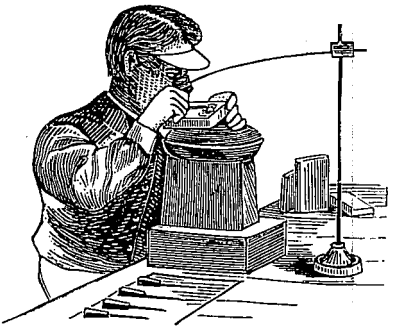


Fig. 43. ENGRAVER AT WORK.

not too tightly, with the thumb and forefinger of the left hand, so it may be easily moved around, or turned, on the pad. With the right hand the graver is held, the handle resting in the palm. The graver is then pushed forward with the thumb and forefinger, guided by the thumb rest-

ing on the surface of the block, as in Fig. 44, or against the side, as in Fig. 45.

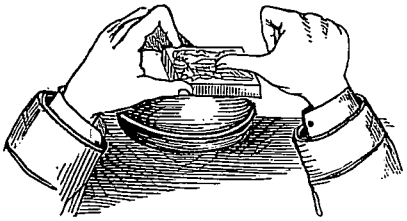


Fig. 44.

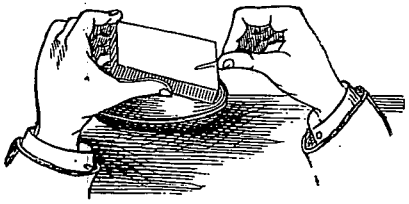


Fig. 45.

Various contrivances have been devised for protecting the eyes when working at night by lamplight. One of the best is that which not only protects the eyes by softening the light, but shields the face from the heat of the lamp. This consists of a large glass globe filled with clear water, and placed in such a position as to allow the light to pass through it and fall upon the block, as in Fig. 46.

The German student lamp is best for the purpose as its light can be regulated according to the convenience of the engraver, on account of its being movable on the iron standard.

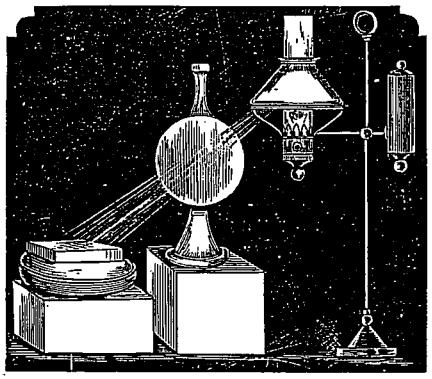


Fig. 46.

Some engravers use the bull's-eye lens, which is a good reflector, and can be easily adjusted to an ordinary lamp.

LESSONS IN ENGRAVING.

DIAGRAMS AND PROOF-TAKING.

FOR the first lesson in engraving a few diagrams are given, which will enable the learner to get the use of the tools somewhat, before attempting more complicated outline cuts.

The lines should be carefully outlined with a fine tint-tool. After the outline is finished on the inside take a wider tool, and carefully cut the wood away from the lines; then outline the outside, leaving an even width of line, and cut away as before; afterwards with a wide scooper clear away the remaining wood.

When finished, a proof may be taken, and the lines trimmed up where irregular.

To take a proof, first put a small quantity of ink on the dabber, and beat it upon the slab until the ink is evenly distributed; the subject engraved should then be dabbed until a sufficient quantity is left upon its surface; a piece of India paper a little larger than the face of the block is laid upon the engraving, a thin card laid upon that, and then burnished over with a paper-folder

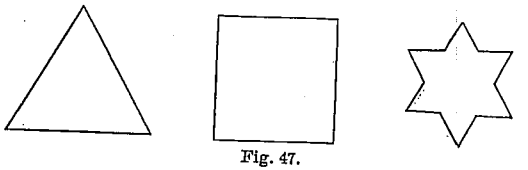


Fig. 47.

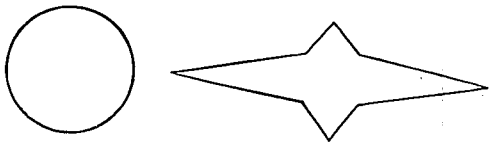


Fig. 48.

until a good impression of the cut is taken. The engraver's prints should be superior to those taken by a pressman. Light and delicate portions of an engraving should be rubbed very gently, and the darker parts brought out by a heavier pressure.

The beginner will find it pleasant to keep proofs of his work, and, by comparison, observe the progress made.

FIGURE OUTLINES.

After engraving the diagrams, each in their order, a careful drawing may be made of the outline subject, Fig. 50. In the engraving, commence at the top of the drawing, and outline with tint-tool, being careful to leave as much surface as the pencil lines cover. After out-

Fig. 49. FIGURE OUTLINED.

Fig. 50. FIGURE FINISHED.

lining, clear away the wood, being careful not to bruise the lines with the under part of the tool. To guard against this, a thick card may be placed under the tool.

The next subjects, Figs. 51 and 52, introduce more variety, and the learner is now prepared to bring into use the experience gained in the previous lesson. The same directions should be followed as in the previous cuts, observing the difference in the strength of line and the variety of outline.

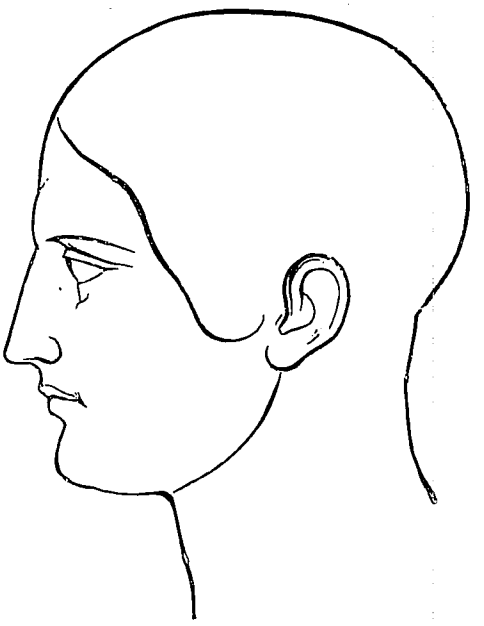


Fig. 51.

Fig. 52.

ENGRAVING TINTS, AND PLUGGING.

Having acquired some degree of freedom in the use of the tools, before commencing on shaded pictures attention should be given to cutting tints. The future success of the pupil depends very much on his skill in tint cutting; and although it may at first seem tedious, yet if persistently and patiently practised it will result in great benefit to him. This stage of engraving is so important that it should receive the most careful attention. A good rule for the learner is to keep constantly on hand a block on which to engrave tints, and to give some portion of each day for the practice of this particular style of work.

To engrave a flat tint, take a small piece of box-wood, wash the surface with Indian ink, and when dry draw very light parallel lines about one-fourth of an inch apart; select a medium-sized tint-tool; place the block on the pad, as in Fig. 44; commence near the right-hand upper corner, directly under the first pencil line; guide the tool with the thumb and forefinger, and cut a line slowly and as straight as possible across the block, being careful to cut an even depth of line. In cutting the second line, place the tool the

width of the line to be engraved below, and push it forward slowly, in short strokes, until the line

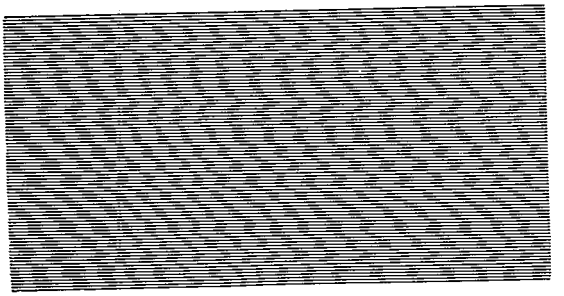


Fig. 53. LIGHT TINT.

is finished, aiming to leave the line as wide throughout as at the beginning.

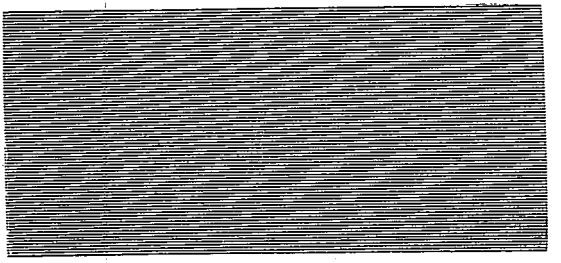


Fig. 54. DARK TINT.

It is not probable that the learner will succeed in keeping the tool from going upward, thus making the line thinner, or downward, making it

thicker; but by following the directions closely he may succeed in making a fair line.

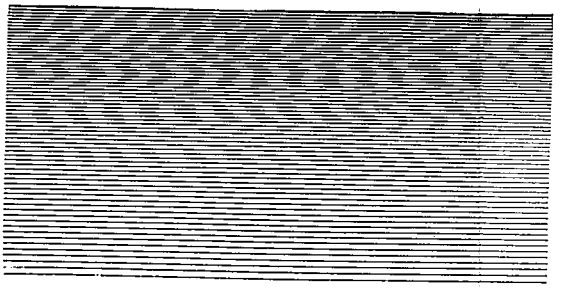


Fig. 55. GRADUATED TINT.

Cut every line carefully, without minding the time it takes, giving more attention to quality

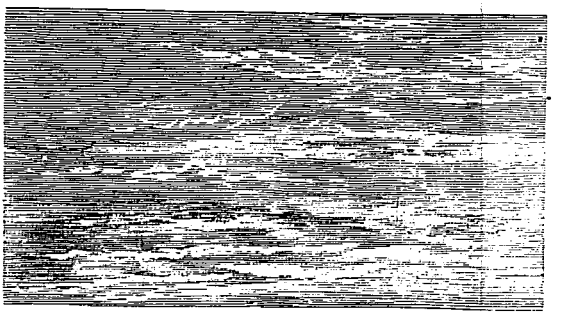


Fig. 56. CLOUD TINT.

than quantity. If the lines commence running up or down, stop immediately, and commence

again under the next pencil line, improving by observing the faults of the previous attempt.

When finished, take the dabber, and with a small quantity of ink, distributed on the ink-slab as explained, beat the block lightly, as in taking proofs, which will show the quality of the work; with a finer tool than before, go over the work. Where the lines are too thick, take a thin shaving off the upper or the lower side of the line, or both, in such a way as to leave it straight and even, being careful not to make the lines too thin by removing too much. Where the lines are too thin they cannot be remedied, and should be let alone.

By using different sized tint-tools a variety of tints may be cut; also, with the same tool more surface of line may be left, and thus a darker tint produced.

After sufficient practice in cutting flat tints proceed with graduated tints, which are produced by varying both the width of line and the distance apart.

Plain tints are used to represent sky and all flat surfaces; the graduated tints, for cylinders and round surfaces. But tints vary, according to the taste of the engraver and the subject to be engraved. Especially does this apply to skies and cloud work, an illustration of which is given. It is formed of lines carefully blended together

with fine gravers. To do this skilfully, the tools used must be kept sharp, which, with artistic feeling on the part of the pupil, will insure a good result; and the means by which it is accomplished cannot be detected without the closest examination.

To make a drawing of the sky tint, trace the darker portions of the cloud work, and offset it lightly on the block with the burnisher; then go over the whole surface with a very light coating of Indian ink. When dry, go over all the darker parts with a second coat, repeating the process if necessary until the light and shade in the drawing compares with the copy. Then with a brush wash in the high lights with Chinese white.

In the engraving, first remove the high lights with a small scooper, then cut the dark parts with a fine graver, and vary the size of the tool according to the shading, the closest attention being paid to the copy.

At this stage of engraving it is well to consider how to remedy mistakes, commonly called slips, which are liable to be made, especially before the learner acquires the use of the tools; but they should be guarded against until they very rarely occur.

When it is necessary to plug a block, first consider how much of the surrounding surface must be taken out to make a close joint which

will not show when printed. A hole is then made in the block with a gimlet, or steel point, and a round, tapering plug formed, a trifle larger

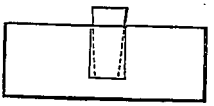


Fig. 57. SECTION OF BLOCK, SHOWING PLUG.

than the hole, and driven like a wedge, so as to fit closely all around. When this is done, saw off the plug with a small watch-spring saw, having

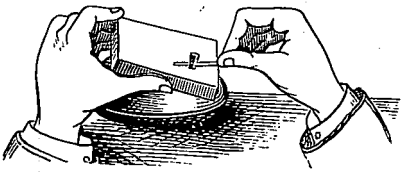


Fig. 58. METHOD OF LOWERING PLUG.

first placed a piece of writing-paper on the block to protect the work; this being done, the plug is shaved down even with the surface, by the use of a very sharp, wide chisel, care being taken not to shave it lower than the surface, as it would then be necessary to re-plug the block.

PORTRAITS.

In portrait engraving a large amount of practice is necessary to enable the beginner to preserve the expression of the face by leaving a sufficient amount of color in all the principal features, such as the eyes, nose, and the under part of the lips. While engraving, bear in mind that cutting away and weakening the color in the features cannot be easily remedied, but if the parts are too dark they can be readily lightened. To be a successful portrait engraver, one's whole time and attention should be given to this branch of the art.

In the two examples given a variety of work is introduced. The flesh tint in Fig. 59 is a good illustration of white cross-lining, which is the opposite of black cross-lining, or cross-hatching, and is produced by cutting ordinary lines, to conform to the surface of the face, which are afterwards cross-lined, the same rule being observed in making the lines conform to the surface of the face, which gives it increased roundness and finish. These rules apply not only to face tints, but to flesh tints generally. Fig. 60 shows the delicacy and roundness of the face and hands,

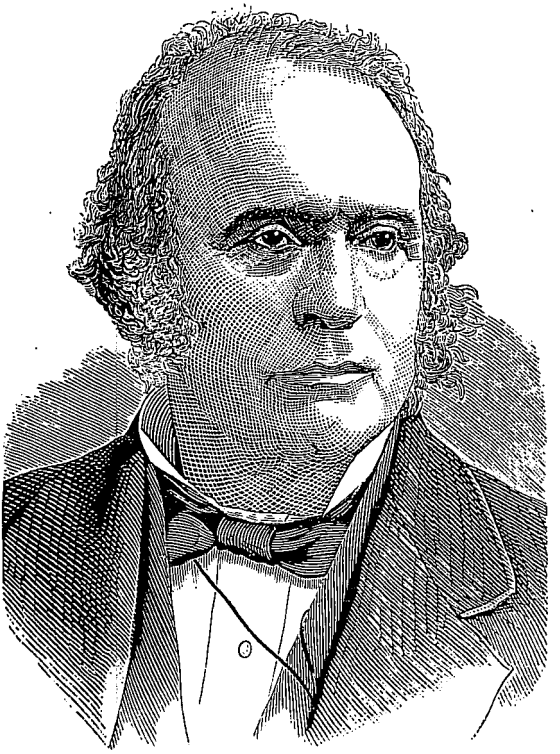


Fig. 59.

Fig. 60.

the free and wavy character of the hair, and the variety of drapery.

The methods employed in cutting portraits are so varied that it would be advisable to collect and study the different styles, and select the best subjects for practice.

When the subject is to be copied from a photograph or carte-de-visite, the services of the photographer should be called into use, and the subject photographed on the block, thus giving all the features in the minutest detail.

By a careful study of engraved portraits the learner should make himself familiar with the mode by which the form of the features is preserved. After this has been done, if prepared to carry out the instructions with judgment, and with a definite object in view, he will, in a measure, be successful. But if there is any uncertainty about the proper way to treat a portrait, do not attempt it until by further observation and study the way is made clear.

LANDSCAPES, FOLIAGE, ETC.

Landscape engraving requires a considerable amount of artistic skill on the part of the engraver in order to produce the ever-varying character of the objects composing the picture.

The beginner should study each and all of the separate parts, giving them the closest attention while cutting; for however nicely the work may be done, if there is no thought expressed, no ap-

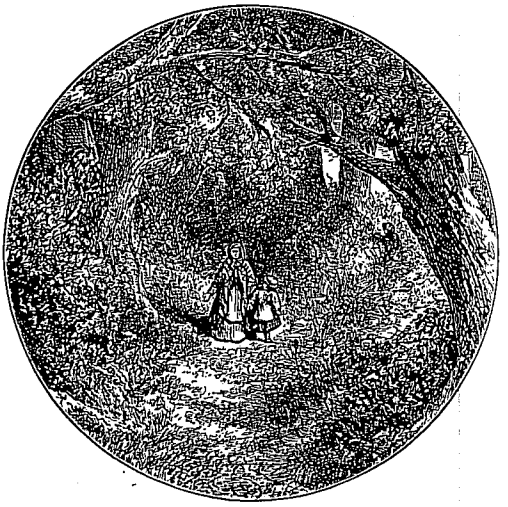


Fig. 61. WOOD SCENE.

parent understanding of the character or texture of the parts, the attempt will result in failure. It would be much better to leave the engraving in an unfinished state than to work upon it without meaning. It would be better still to give the

natural form and appearance without too much regard to the *smoothness* of finish.

In the first example given we have a good subject, a native forest clad in the luxuriant foliage

Fig. 62. ROCKS AND WATER.

of early summer. The effect of coolness, which is suggested in the shades, and the warmth of sunlight streaming through the branches, are produced by a judicious use of the graver. The means by which the feeling is introduced will be seen by observing the style of cutting in the copy.

In the next engraving of rocks and water it

will be noticed that the rocks in the distance are cut more delicately than in the foreground, the same rule being observed in the treatment of the sky and foliage in contrast with the foreground, the lines of which have more strength and character.

FLOWERS, VEGETABLES, ETC.

Flowers and leaves are usually represented in delicate tints. In Figs. 63 and 64 we have two good subjects for practice, — the one a well-arranged bouquet, made up of a variety of flowers and leaves, and the other a basket-bouquet. The cuts of squash and sweet-corn are intended to show the difference between qualities and textures of articles of this class, and the difference of treatment in cutting.

Fig. 63.

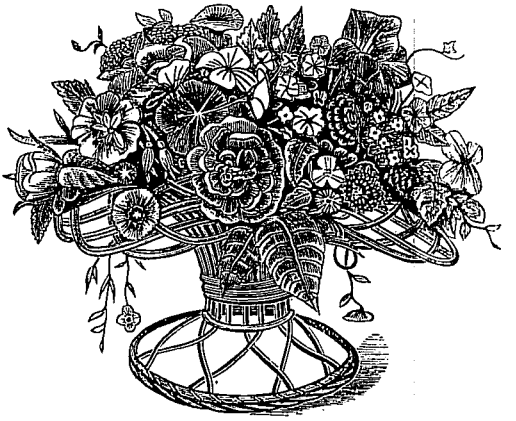


Fig. 64.

Fig. 65.

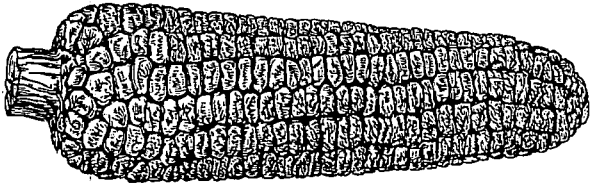


Fig. 66.

EFFECTIVE DESIGNS — SILVER WARE, JEWELRY, ETC.

The examples here given (Figs. 67 and 68) show with what ease effects of light and shade are produced in wood engravings. Figs. 69 and 70 are more elaborate, showing the adaptability of this style of cutting to ornamental designs.

Fig. 67. DESIGN IN WHITE.

Fig. 68. DESIGN IN BLACK.

A similar effect is observable in the cuts of silver ware and jewelry, Figs. 71, 72, and 73. These will be found good subjects for practice. By noticing what produces a good effect, and attend-

Fig. 69.

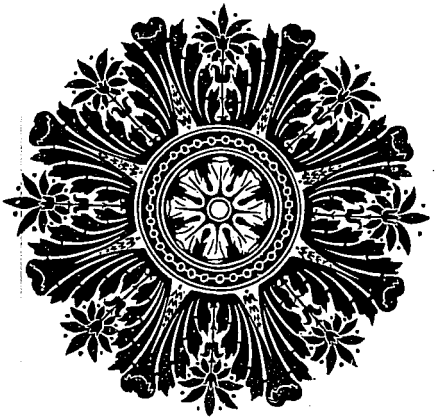


Fig. 70.

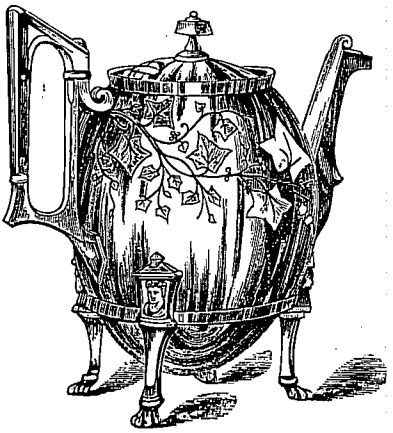


Fig. 71.

Fig. 72.

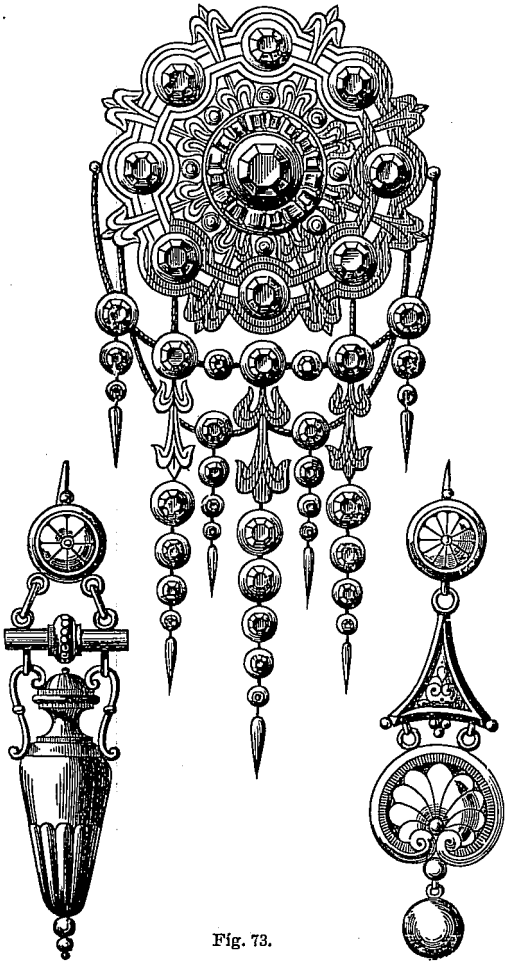


Fig. 73.

ing to the faults in his work, the learner will improve and from his experience learn to avoid future mistakes.

FAC-SIMILE PEN WORK

requires the same outlining and cutting away as in other outline engravings, the greatest care to be exercised while removing the wood to avoid breaking down the lines that are to be left in relief. Figs. 74 and 75 require much greater skill in the cutting than Fig. 76, the delicate hair lines being as sharp as it is possible to engrave them.

In reproducing a finely written autograph, the light lines should be made even lighter than in the copy, for when subjected to the pressure of the printing-press they will appear stronger than in the original. The curves should be free and natural, and the heavy strokes not *too heavy*. The original should be kept at hand for constant reference while the work is in progress.

Under the head of

MONOGRAMS AND INITIAL LETTERS,

a few samples are given. Fig. 80, composed largely of fine lines, and 82, heavier in style, are both suitable for marking clothing, or for orna-

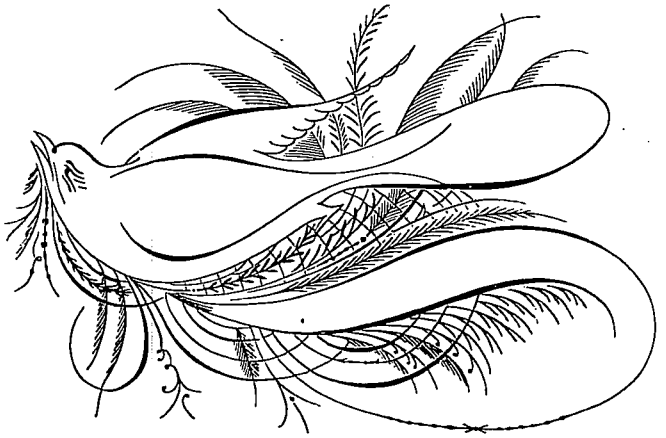


Fig. 74.

Fig. 75.

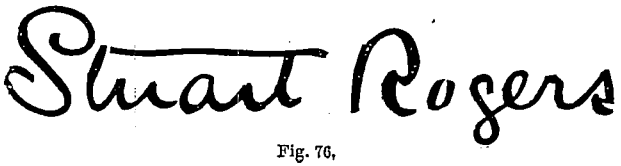


Fig. 76.

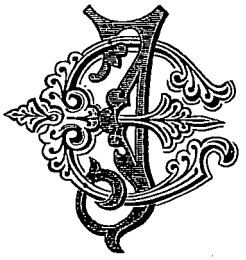


Fig. 77.

Fig. 78.

Fig. 79.

Fig. 80.

Fig. 81.

Fig. 82.

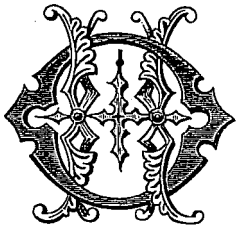


Fig. 83.

Fig. 85.

mental chapter headings; 78 and 84 for handkerchief monograms; 77, 79, 83, and 85 for circular headings, etc.; 81 as a seal.

LABELS AND CARDS

should be designed with reference to the purpose or use for which they are intended as well as for

Fig. 86.

the manner in which they are to be printed. To illustrate: Fig. 86 is designed for an axe label, and in order to look well should be printed in bronze on steel-blue paper. Any additional fine

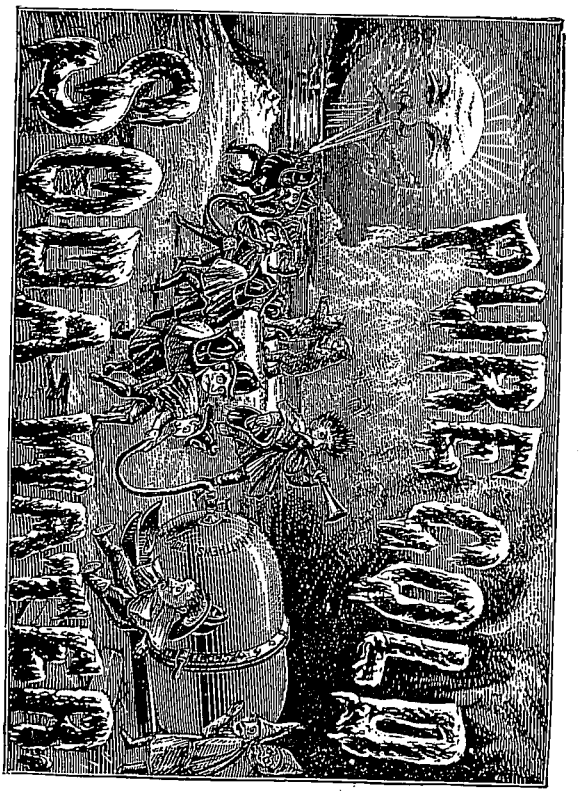


Fig. 87.

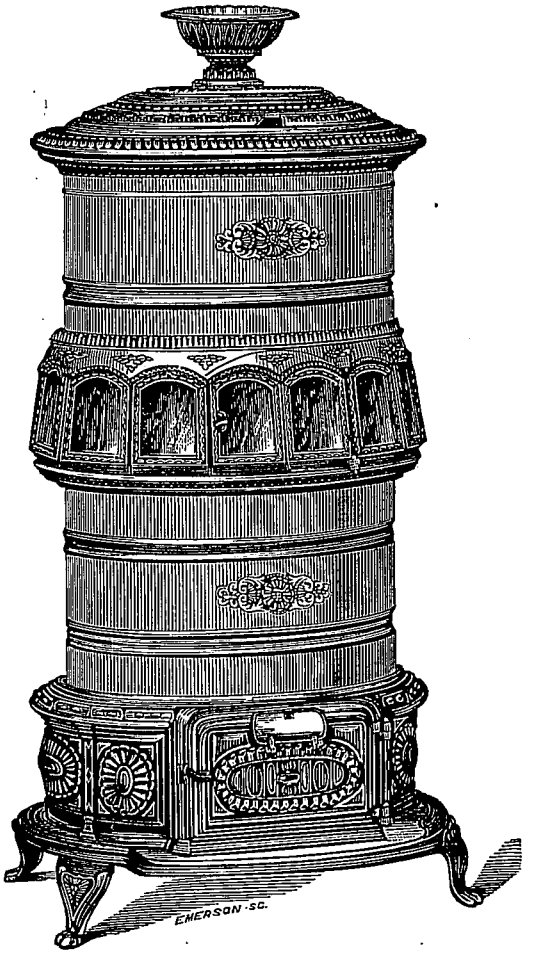
work on such a label would only detract from its neatness.

Fig. 87 is a reduced copy of a large show-card. The appropriateness of the design will be readily

Fig. 88.

seen. It appears well either in plain black or in colors.

By observing the general design of labels on the different classes of manufactured goods, some practical knowledge may be acquired which


EMERSON-SC.

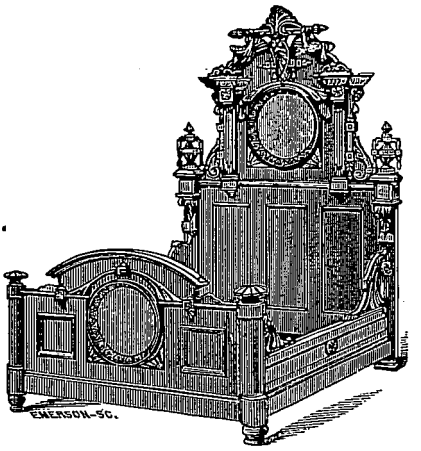


Fig. 90.

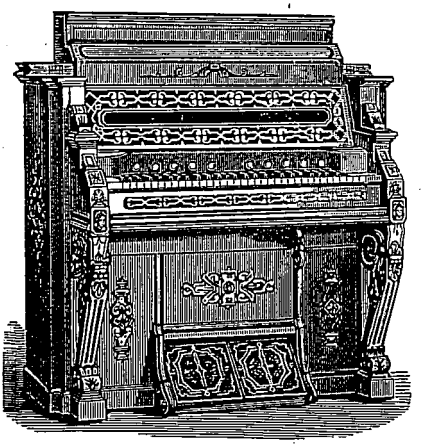


Fig. 91.

will prove useful when work of this kind is called for.

In representing STOVES, of which there are an infinite variety of patterns, the best and surest way is to work from a photograph, either making a careful drawing on the wood from the photograph, or having it photographed directly on the block. A common fault with engravers is that of introducing too much shading underneath stoves, as it tends to destroy the sharpness of outline, and does not appear well in ordinary printing. A slight shade is sufficient in most cases. Another point should be noticed in the engraving of cook-stoves. The stove-lids, or openings on the top for kettles, boilers, etc., which are almost invariably shown in perspective, should be drawn or engraved with no perceptible deviation from the copy. Should these parts be out of drawing, the stove-top will appear warped and distorted when the cut is finished.

The body, or upright surfaces of stoves, especially where the form is cylindrical, should be represented by vertical lines, and the top surfaces, if flat, by horizontal.

Figs. 88 and 89 are introduced as examples of this class of work.

In the engraving of FURNITURE, ORGANS, etc., the style of work does not differ essentially from that on stoves, and the same general directions may be followed to advantage.

BUILDINGS

should not be composed too largely of flat tints. The parts exposed to the light should be broken up by introducing the proper amount of effect, the same principle applying to the cloud work, ground, and foliage. This done, and a few figures introduced will not fail of producing a lively picture. A good idea of the effect desired may be gained by observing the rule by which the artist determines the tints of nature. It may be that with eyes wide open you cannot detect color or shade on the face of a building exposed to a strong light, but when you *almost* close your eyelids the scene changes, the minute detail of the picture is lost, and you have in its place simply the effect. Such a study of the windows, cornices, and other projections will suggest new methods of treatment.

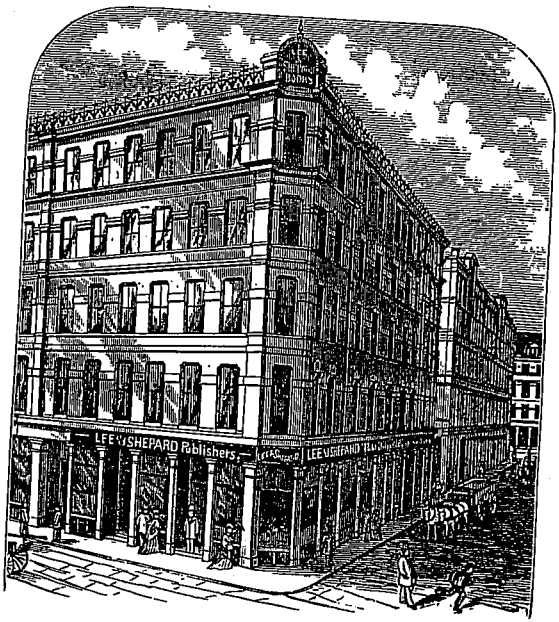


Fig. 92.

Correct perspective is another thing to be observed, for if this be rightly managed, even a plain and unpretentious building may be made to assume a substantial appearance.

Wood-cuts of

COMPLICATED MACHINERY

should be engraved from a photograph whenever it is possible to obtain them. Drawings made from sketches are seldom satisfactory, as the proportions cannot be so accurately preserved, and the several parts are liable to appear clumsy. Defects of this kind in form or outline are quickly detected by mechanics, and a wrong impression of the merits of the machine sometimes conveyed when the fault is wholly in the cut.

In order to become a good machine-engraver, constant practice and a careful study of the work of first-class engravers is necessary.

The beginner would do well to make a collection of machine-prints, preserving them in a scrap-book for future reference. Sometimes it is necessary to break away portions of a machine where the construction is such as to hide the parts to be represented, in which case the intervening portions may be shown broken-open, as in Fig. 94.

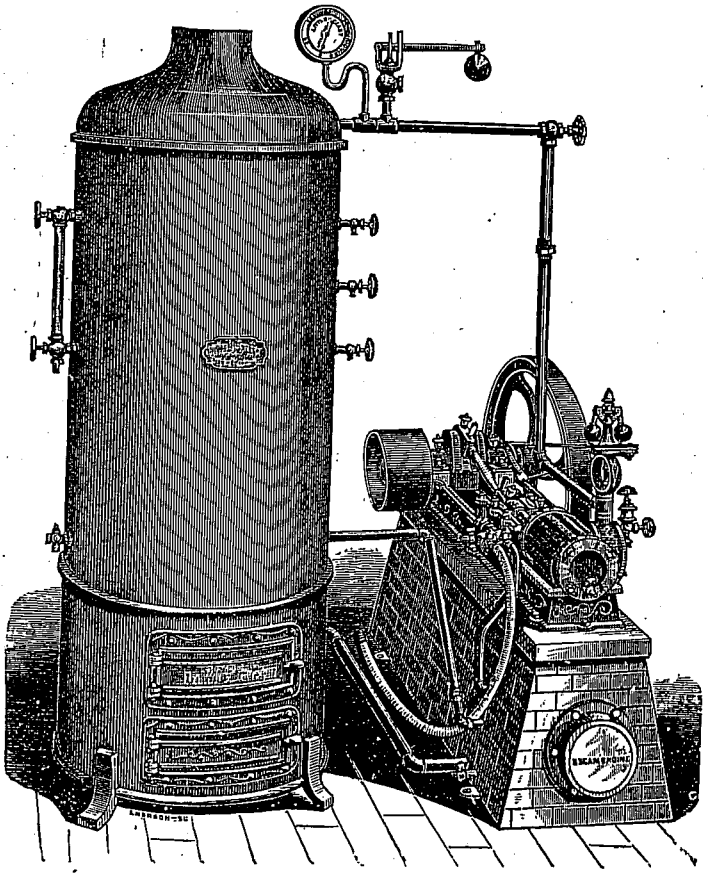


Fig. 93. MACHINERY.

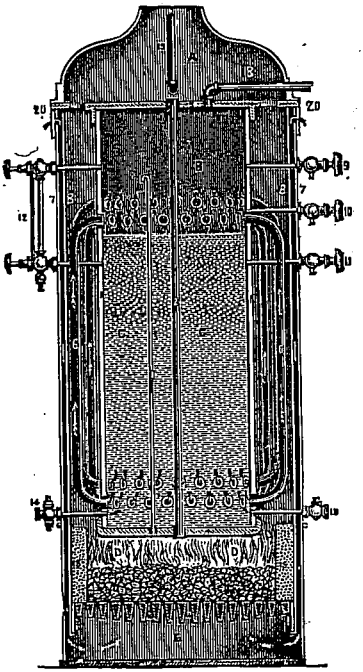


Fig. 94.

BIRDS AND ANIMALS

are often difficult subjects to represent naturally. The varied plumage of birds, and the great difference between qualities and textures in the

Fig. 95.

covering of animals, give a wide range for the display of the engraver's skill.

Figs. 95 and 96 are introduced as subjects for practice.

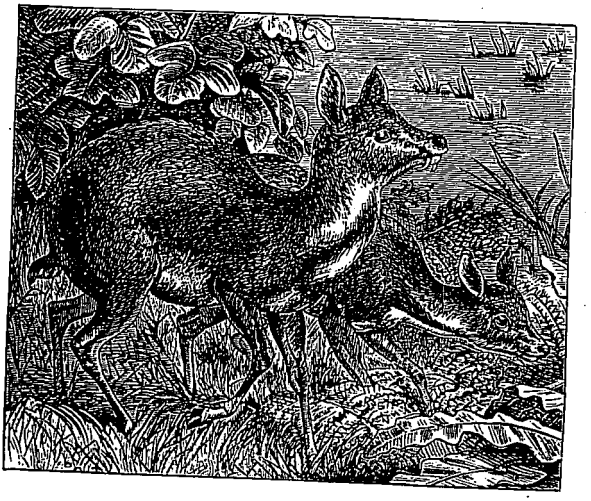


Fig. 96.

COLOR ENGRAVING.

The practice of printing wood-cuts in colors, from different blocks, originated towards the close of the sixteenth century. It was discovered by Albert Dürer, who found the art of wood-engraving in its infancy.

The invention was used at that time principally in ornamental designs, but has now attained a high degree of perfection, being used not only in

Fig. 98.

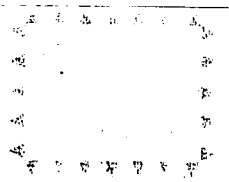


Fig. 99.

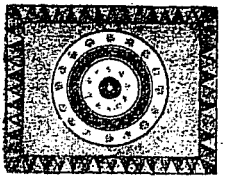


Fig. 97.

Fig. 100.

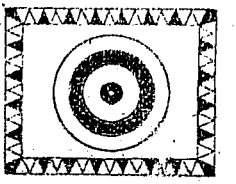


Fig. 101.

common merchandise labels and ornamental designs, but in the finest book illustrations.

Before commencing a color engraving it is desirable to make a complete design in colors, from which to copy the engraving. From this draw and engrave the principal block; then take a proof, and transfer to another block, from which cut away all except the portions necessary to print the next color; proceed in the same manner with the remaining colors, transfers being taken from the principal block for each color. As an illustration, the blocks used in the accompanying color design (Fig. 97) are shown separately.

In printing, the lightest blocks are printed first, and the principal, or black, last. Each should register perfectly.

In order to better understand the relation of one color to another, we start out with the simple theory advanced by Sir Isaac Newton, that there are three colors, and only three. These are called primary colors, because they are original, self-existent, and cannot be produced by any combinations. Their names are blue, red, and yellow. Notwithstanding the simplicity and clearness of this system, it has been attacked by scientific men, and important changes suggested; yet it has been believed in and agreed to by all painters of all countries.

As much of the beauty of color engraving depends upon the knowledge and taste shown in the arrangement of the colors, it is well in this connection to give considerable attention to the harmony and contrast of colors. A few hints may help the learner in the grouping of his colors.

First, let it be remembered that the three primary colors cannot be used in close proximity without injurious effects. The primary of first importance is

Blue. It may be largely used in nice color-work. Its most perfect harmonies are those shades of itself which are produced by mixing it with white or black. Its contrasting color is orange.

Red, the second primary, has green for its contrasting color, and orange and crimson for its harmonies.

Yellow has purple for its contrast, and lighter shades of itself and orange for its most perfect harmonies.

A word of caution in regard to the use of green may not be out of place. It is often too freely used with other colors on account of its lighting-up power. It should be sparingly used in color-work, and then not for its own value, but for its effect upon other tints.

Gold is often used in the place of yellow; and

a very common combination is that of blue, red, and gold.

Gray is in harmony with brilliant hues of blue and crimson, and may be introduced into almost any combination with safety.

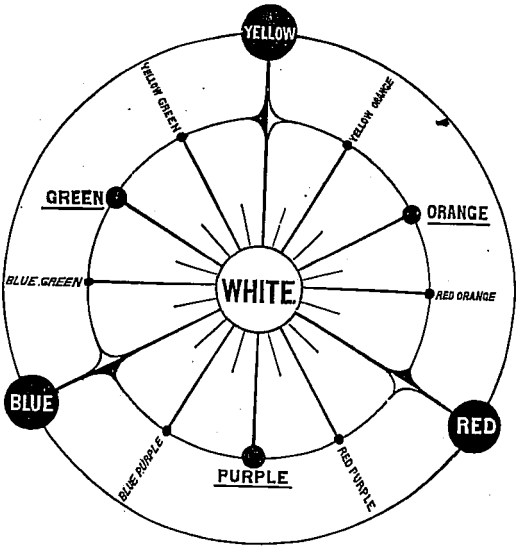


Fig. 102.

A better idea of the harmony and contrast of colors may be derived from a study of the *Color-circle Diagram*, which will be useful to refer to from time to time. To illustrate its use, take

red for an example; opposed to it we find green in contrast. This rule applies to the other primaries, and to the half-way colors as well, their opposites being a perfect contrast.

To determine harmony, take green as an example. Moving along the inner circle on either side of green, we find the harmonies decrease as we proceed, until we reach its most imperfect ones, blue-purple and yellow-orange. Still moving along both sides of the circle, the colors grow more and more pleasing, until we reach its most perfect contrast, red.

The study of colors will prove a fascinating one the more the subject is looked into.

Color designs collected and preserved in a scrap-book for reference will prove of value to the learner; also the habit of experimenting and noting the combinations which are most pleasing. In this way he will find pleasant exercise for his designing powers.

ELECTROTYPING.

The invention of Electrotyping, by which wood-cuts and type are reproduced, is comparatively recent, although experiments in electroplating were made in Europe from 1801 to 1845 with more or less success.

It is a chemical and mechanical operation combined, and is performed in the following manner: A mould is made of pure wax, upon which the wood-cut is impressed by means of a press of sufficient power to bring out even the finest lines; the mould is then covered with a fine coating of plumbago, which is evenly distributed by brushes, thus giving a conducting medium for the electric current, which is further strengthened by a wash of sulphate of copper, thus covering the entire surface with a thin film, and hastening the deposit of copper. The wires from an electro-magnetic battery are attached to the mould, which is then suspended from a metal rod in a trough containing a solution of acidulated sulphate of copper; copper plates are suspended in the solution, which face the mould but do not touch it; the rods are connected with the battery by wires; and when the circuit of electricity is completed the copper plate is rapidly decomposed and deposited on the face of the mould; in ten or

twelve hours a copper shell is formed, which, on being removed from the mould, receives a coating of chloride of zinc; melted type-metal is then poured or dipped into the shell, and, after cooling, the face is laid on a perfectly level iron plate, and the superfluous type-metal planed off, and the plate squared and trimmed up, and screwed on blocks of wood, which bring them to the height of type.

It is best to have a wood-cut electrotyped before printing from it, and to preserve the engraving, from which electrotypes may at any time be taken.

CONCLUSION.

Having given, in a few lessons, directions as simple and practical as possible, it now remains for the learner to make the best use of the information given, and according to his own aptness and diligent application will he be able to engrave well in a longer or shorter time. Perfection in engraving is never reached, and the best engravers see higher and better results to be attained. Then set your standard high; let no opportunity for acquiring information pass unimproved; learn something new from every attempt;

be not easily satisfied with your own engraving, but strive to remedy its faults.

With the hope that these suggestions may be of value, and that the instruction herein contained may serve the purpose intended, we leave our readers to achieve the success which perseverance and a love of the art will insure.

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